ST5801GB Series Outdoor AP/Bridge User Manual

Kareem

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Chapter 1: Product Overview

Introduction

The ST5801GB SERIES OUTDOOR AP/BRIDGE series are enterprise and carrier-grade 802.11N Outdoor Wireless Access Point which offers customer a robust and high performing solution for PTP/PTMP/Hotzone applications in both license-free 2.4GHz and 5GHz bands.

The ST5801GB03R is the most ideal candidate for Service Providers looking to deliver carrier-grade wireless services to multiple market segments such as campuses, hospitality, healthcare, warehousing and wider metropolitan area deployments.

Designed to meet customer needs in a broad range of industries, the ST5801GB SERIES OUTDOOR AP/BRIDGE offer the following benefits :

Flexible wireless backbone deployment options

Multiple radio interfaces were integrated by FonSee's core data switching technology inside the ST5801GB SERIES OUTDOOR AP/BRIDGE series. Each radio interface can be configured independently to meet different wireless connectivity purposes. With the fast data switching between multiple radio interfaces, the backbone throughput will remain in a high level even after several relays between APs.

High-performance wireless backbone

With the next generation 802.11N MIMO technology, the ST5801GB SERIES OUTDOOR AP/BRIDGE offer data link rate up to 300Mbps in each single radio interface. Short Guard Interval and Frames Aggregation methodology configurations improve the efficient of backbone usage.

Secure and efficient client connectivity

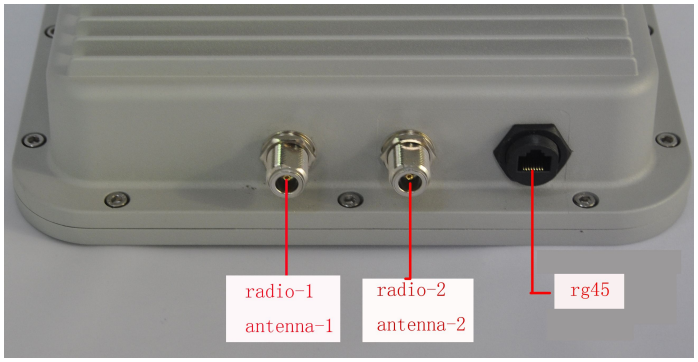
The nimble QoS (Quality of Service) configuration provides flexible management of user's access bandwidth of wireless connectivity. Perfect integrated with central RADIUS server and data encryption technique, the ST5801GB SERIES OUTDOOR AP/BRIDGE series provide a secure wireless connectivity for each client device.

ST5801GB SERIES OUTDOOR AP/BRIDGE Category

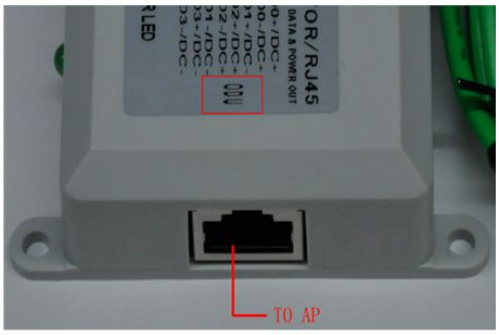
Model	Radio Spec.	Radio Amount
ST5801GB01R	Dual-Band 2x2 MIMO Normal Power	1
ST5801GB02R	Dual-Band 2x2 MIMO Normal Power	2
ST5801GB03R	Dual-Band 2x2 MIMO Normal Power	3
ST5801GB01RH	Dual-Band 2x2 MIMO High Power	1
ST5801GB02RH	Dual-Band 2x2 MIMO High Power	2
ST5801GB03RH	Dual-Band 2x2 MIMO High Power	3

Installation

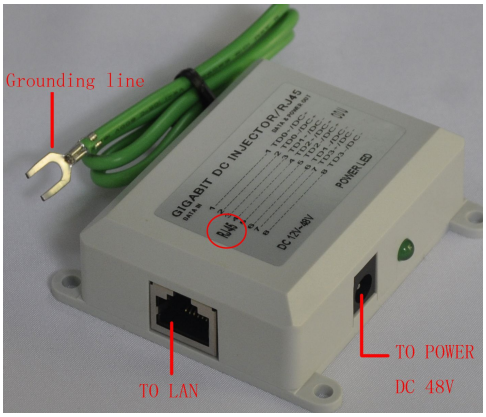
The ST5801GB SERIES OUTDOOR AP/BRIDGE series product has up to 3 dual-band 2X2 MIMO radio interfaces. Each 2X2 MIMO radio interface will has 2 N-type connectors come out on the waterproof housing. We strongly recommend that check antenna attachment to match your configuration before the installation.



A PoE is the power supply of the ST5801GB SERIES OUTDOOR AP/BRIDGE series. Please connect the ETH1+Power port to the included PoE injector by Ethernet cable.



Connect another data port on the PoE injector to your LAN switch or PC, if necessary.



Package Contents

- ST5801GB SERIES OUTDOOR AP/BRIDGE 802.11A/G/N Outdoor Wireless Bridge
- PoE Power Injector
- Power Adapter
- Mounting Kit & Screw
- CD: User Manual

Chapter 2: System Configuration

Access the Browser-Based Utility

To access the system web user's interface, launch the web browser on your computer, and enter the device IP address in the Address field of the web browser. (The factory default IP address is 192.168.1.1.) Then press Enter.

A login screen will appear. Go to the login page by Click the "Home > Login" in sub-menu. Login ID and password is required before access the system web user's interface. The default administrator's ID is ***admin*** and password is ***admin***. For normal user's login ID is ***user*** and password is ***user***. Configuration will be not available for user account.

The configuration page was vertically divided into right and left part. Items in the left part show the concurrent configuration corresponds to the items in right part.

Please do remember to click the ***Apply*** button on the very bottom of every page to make your configuration changes effected; otherwise the changes you just made will be ignored once you leave the current page. You can also click the ***Cancel*** button to regret the changes.

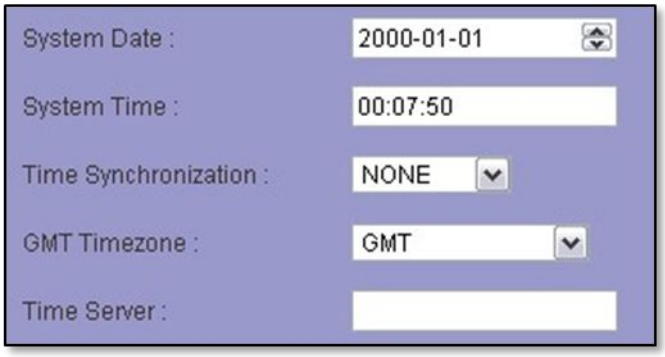
System Setup

A ***System Setup*** includes device related elements, such as system time and IP setting.

System Setup > Basic Setup

Language The ST5801GB SERIES OUTDOOR AP/BRIDGE series WEB GUI is designed to support English language in display. Users can choose the proper language in language list.

Device Name User would like to give a name for identifying a particular outdoor access point in here.



System Date User would like to set the date manually in this item.

System Time User would like to set the time manually in this item.

Time Synchronization Time synchronization setting will decide the duration to next time synchronization. When any NTP server is available in network, user can enable the NTP and system will automatically synchronize system time with NTP server.

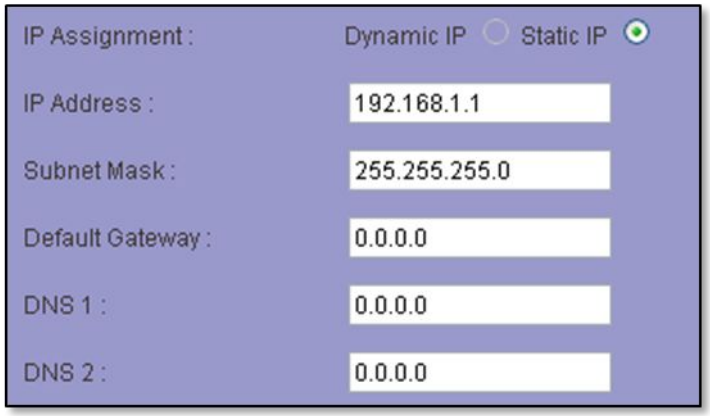
GMT Time zone Set a Greenwich Mean Time setup

for time synchronization.

Time Server User can insert an available IP address of NTP server in Internet for time synchronization.

System Setup > Network Setup

IP Setup



IP Assignment System allows you to assign the device IP address dynamically from existing DHCP server or set a static IP address manually.

IP Address Once **Static IP** was selected, the IP Address field will allow you to set the bridge device IP address manually. This IP address of the bridge is used as the base for all of your local network settings.

Subnet Mask This is the subnet mask address for your bridge device. Set the IP subnet mask manually.

Default Gateway Set the default gateway IP address manually.

DNS 1 & 2 The Domain Name System (DNS) is how the Internet translates domain or website names into Internet addresses or URLs. Your ISP will provide you with at least one DNS Server IP Address. If you wish to use another, enter that IP Address in **DNS 2** field.

Spanning Tree Protocol

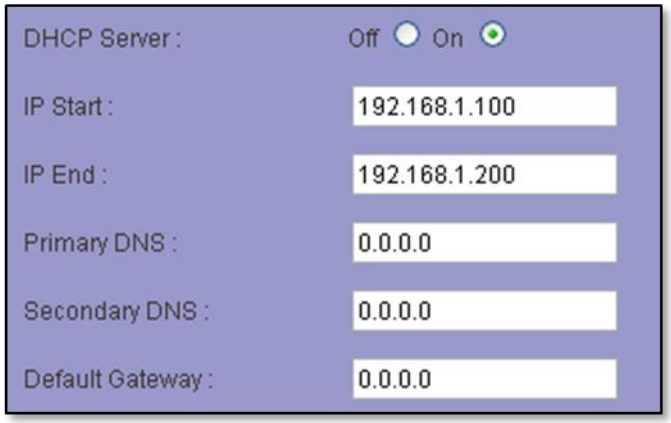
STP The Spanning Tree Protocol (STP) is a network protocol that ensures a loop-free topology for any bridged Ethernet local area network. The basic function of STP is to prevent bridge loops and ensuing broadcast radiation. Spanning tree also allows a network design to include spare (redundant) links to provide automatic backup paths if an active link fails, without the danger of bridge loops, or the need for manual enabling/disabling of these backup links.

Ethernet Link Speed

Link The link speed of Ethernet port can be changed manually into 10/100 Half/Full duplex.

DHCP Server Setting

The ST5801GB SERIES OUTDOOR AP/BRIDGE series can be configured as a DHCP server for a LAN network. Once the DHCP Server is chose as on, the DHCP server setting elements will spread out on the page.



DHCP Server Allows you to enable or disable the DHCP server function in system.

IP Start / End The IP Start and End Address specify the range of addresses assigned by your device when it functions as a DHCP server.

Primary & Secondary DNS Set the primary and

secondary DNS server IP address which DHCP server is going to assign for DHCP client devices.

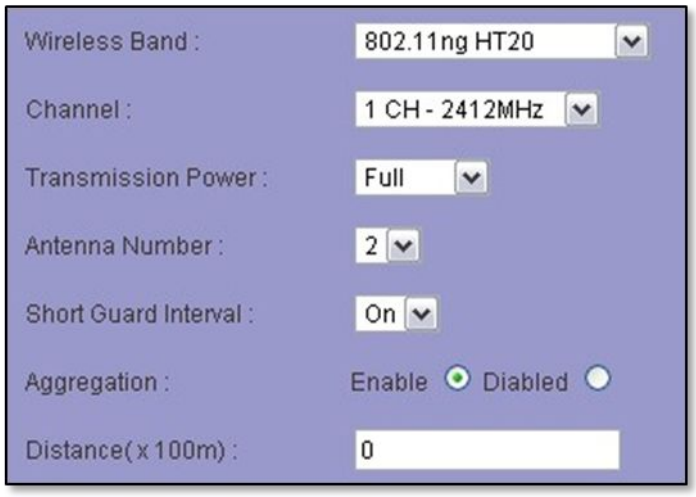
Default Gateway Default gateways IP address assign for DHCP client devices.

Management VLAN

Management VLAN Management VLAN is a secure VLAN which divides Internet users from device IP access. Administrators can management network devices under the Management LAN network without betrayal of secrets.

Wireless

Wireless > Radio Setup



Wireless Band Choose a radio frequency for signal transmission. The frequency and channel bandwidth match to selection is showed as following table:

Selection	Frequency	Channel Band Width
802.11G	2.412 GHz - 2.462 GHz	20 MHz
802.11NG HT20	2.412 GHz - 2.462 GHz	20 MHz
802.11NG HT40 Plus	2.412 GHz - 2.442 GHz	40 MHz
802.11NG HT40 Minus	2.432 GHz - 2.462 GHz	40 MHz
802.11A	5.18 GHz - 5.32 GHz 5.50 GHz - 5.58 GHz 5.66 GHz - 5.70 GHz 5.745 GHz - 5.825 GHz	20 MHz
802.11NA HT20	5.18 GHz - 5.32 GHz 5.50 GHz - 5.58 GHz 5.66 GHz - 5.70 GHz 5.745 GHz - 5.825 GHz	20 MHz
802.11NA HT40 Plus	5.18 GHz - 5.30 GHz 5.50 GHz - 5.54 GHz 5.66 GHz 5.745 GHz - 5.785 GHz	40 MHz
802.11NA HT40 Minus	5.20 GHz - 5.32 GHz 5.52 GHz - 5.56 GHz 5.68 GHz 5.765 GHz - 5.805 GHz	40 MHz

Channel Available channel will relate to what wireless band is chosen.

Transmission Power Control the transmit power of a radio by selection of Transmission Power.

Antenna Number ST5801GB SERIES OUTDOOR AP/BRIDGE series complete 802.11n 1x1 1-steram and 2x2 2-stream for antenna attached. The maximum data link rate at 1-steram and 2-stream will be 130Mbps and 300Mbps.

Short Guard Interval The guard interval is the space between symbols (characters) being transmitted. Adding time between symbol transmissions allows these echoes and reflections to settle in before the next symbol is transmitted. In normal 802.11 operations, the guard interval is 800 ns. A short guard interval will short the time between symbol transmissions into 400 ns to enhance the efficiency of data transmission.

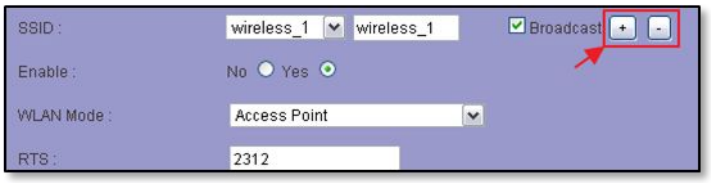
Aggregation Frame aggregation is a feature of the 802.11n wireless LAN standards that increases throughput by sending two or more data frames in a single transmission.

Distance To assign a distance between nodes in a

point to point transmission will improve the success rate of data transmit.

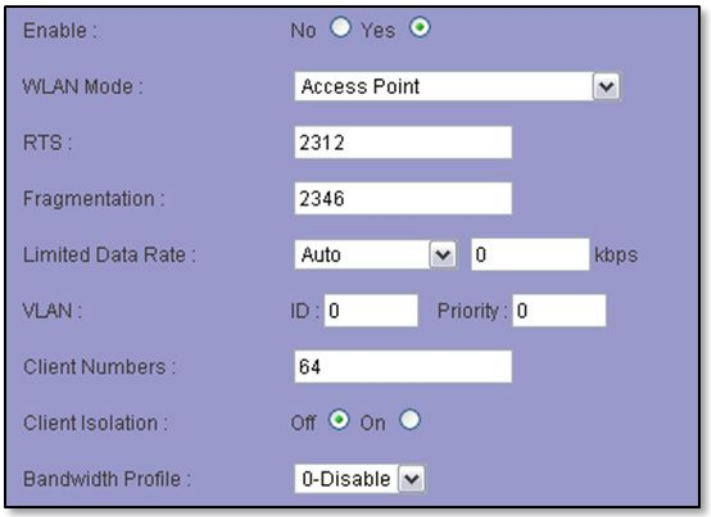
Wireless > WLAN Setup

Each physical radio interface supports up to 16 virtual WLAN AP setting. User can add or delete a virtual AP by click the "+" or "-" button on top of the very right side of setting block.



SSID A service set identifier (SSID) is a name that identifies a particular 802.11 wireless LAN. A client device receives beacon messages from all access points within range advertising their SSIDs. The client device can then either manually or automatically select the network with which to associate.

Broadcast Network administrator can choose broadcast beacon messages of a virtual AP by checking the broadcast block.



Enable Network administrator can also decide functioning of virtual AP or let it idle.

WLAN Mode Radios support "Access Point", "Wireless Station", "Access Point (WDS Support)" and "Wireless Station (WDS Support)" mode to meet various network scenarios.

RTS "Request to send" is the optional mechanism used by the 802.11 wireless networking protocol to reduce frame collisions introduced by the hidden node problem. Set the packet size to trigger RTS/CTS enable. This is normally set in AC side only because the hidden station problem does not exit from the perspective of the AP. RTS Threshold can be set between 1 and 2312 bytes.

Fragmentation Set the packet size to activate fragmentation. Fragmentation threshold can be set between 1 and 2312 bytes.

Note: Fragmentation setting will be automatically disabled, once the frame aggregation is enabled.

Limited Data Rate Limit the wireless data link rate to enhance the stability of data transmission.

VLAN ID In order to create a wireless VLAN environment, each virtual AP can conform to an 802.1q VLAN tag ID.

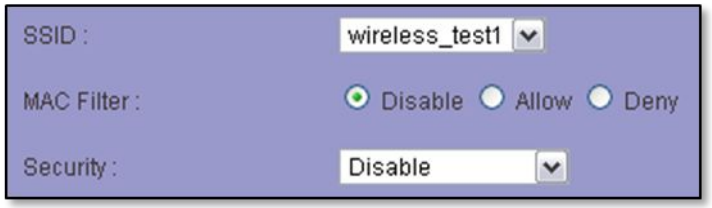
VLAN Priority Each VLAN ID can be gave a priority number (from 0 to 7) for data process priority.

Client Numbers Limit the maximum number of associate client devices.

Client Isolation Client isolation will protect the privacy of each connecting client from searching in a wireless LAN.

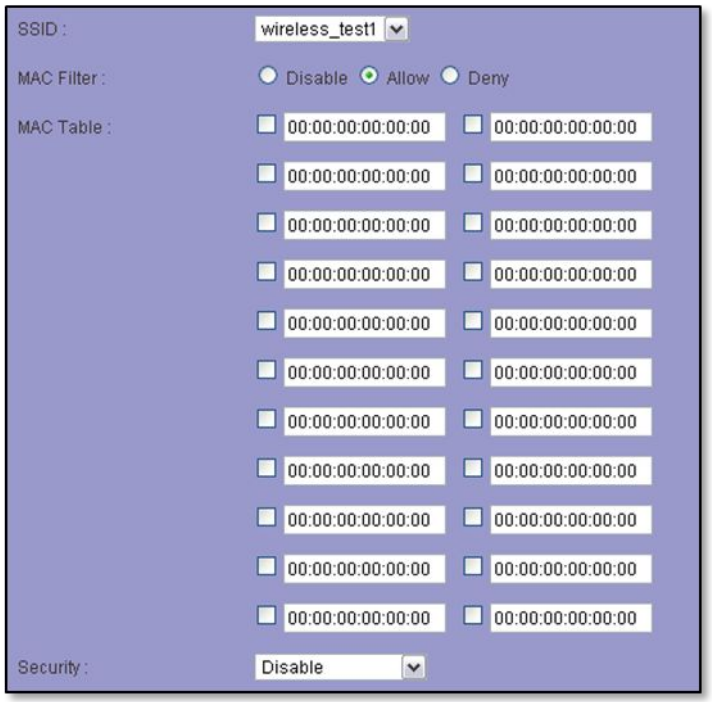
Bandwidth Profile Choose a bandwidth control profile for virtual AP interface. (About the detail of bandwidth profile, please refer to the bandwidth control setup in coming pages.)

Wireless > Wireless Security



SSID User can choose a specific virtual AP to assign a security type of wireless link.

MAC Filter MAC filter provides allow or deny MAC table for administrator to access control of AP by insert a MAC address of client device. When running allow mode, only the MAC address which showing on the table will be accept for wireless connectivity. When running deny mode, MAC address which showing on the table will be blocked from wireless connectivity. The table can be configured 32 MAC address at most of each virtual AP interface.



Security Comprehensive security settings are available on system in this menu. These include WEP Keys and WPA+WPA2-PSK. Details of each type of security are in appendix. The security settings are independent between each virtual AP interface.

WEP System supports 64-bit, 128-bit and 152-bit WEP key in both ASCII and HEX format. Do make sure the correctly number of digits/characters and format of WEP key as shown in the table are entered. Note that in HEX format, HEX number cannot start with "0".

Number of digit/character	ASCII	HEX
64-bit	5	10
128-bit	13	26
152-bit	16	32

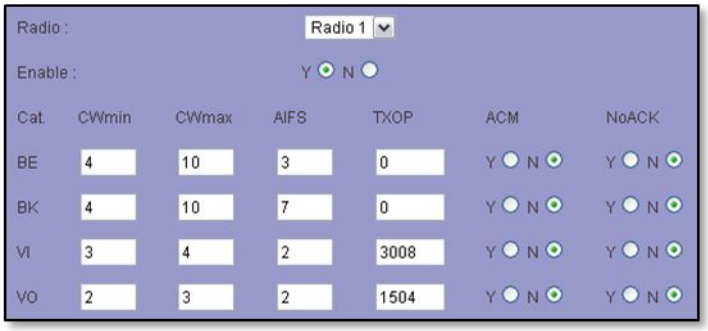
WPA+WPA2-PSK ST5801GB SERIES OUTDOOR AP/BRIDGE series support WPA+WPA2-PSK (WPA-Personal) in security. WPA+WPA2-PSK (Pre-shared key) mode is designed for home and small office networks and doesn't require an authentication server. Each wireless network device authenticates with the access point using the same 256-bit key.

TKIP Temporal Key Integrity Protocol: A 128-bit per-packet key is used, meaning that it dynamically generates a new key for each packet. Used by WPA.

CCMP An AES-based encryption mechanism that is stronger than TKIP. Sometimes referred to as AES instead of CCMP. Used by WPA2.

Both TKIP and CCMP encryption are available for WPA+WPA2-PSK. Pre-shared key of 8 to 63 characters are required. Group Rekey Interval can be set up to 65536 seconds.

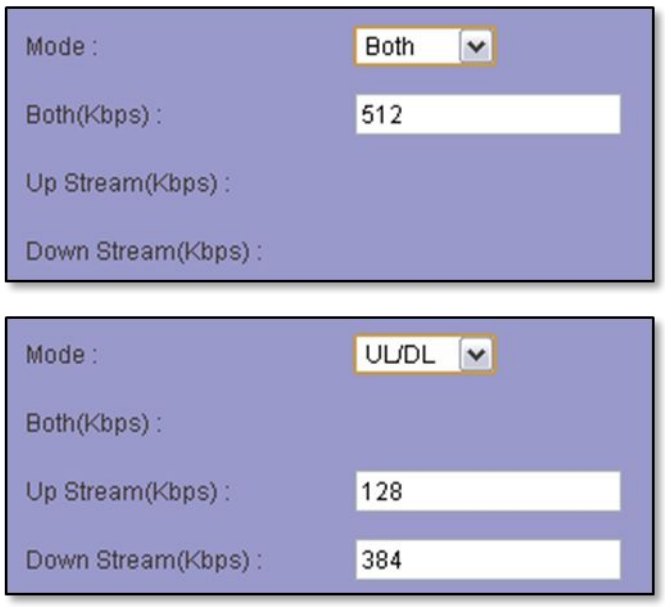
Wireless > WMM Setup



Wi-Fi Multimedia (WMM) is a Wi-Fi Alliance interoperability certification, based on the IEEE

802.11e standard. It provides basic Quality of service (QoS) features to IEEE 802.11 networks. WMM prioritizes traffic according to four Access Categories (AC) - voice, video, best effort, and background. It is suitable for simple applications that require QoS, such as Voice over IP (VoIP) on Wi-Fi phones (VoWLAN).

Wireless > Bandwidth Control



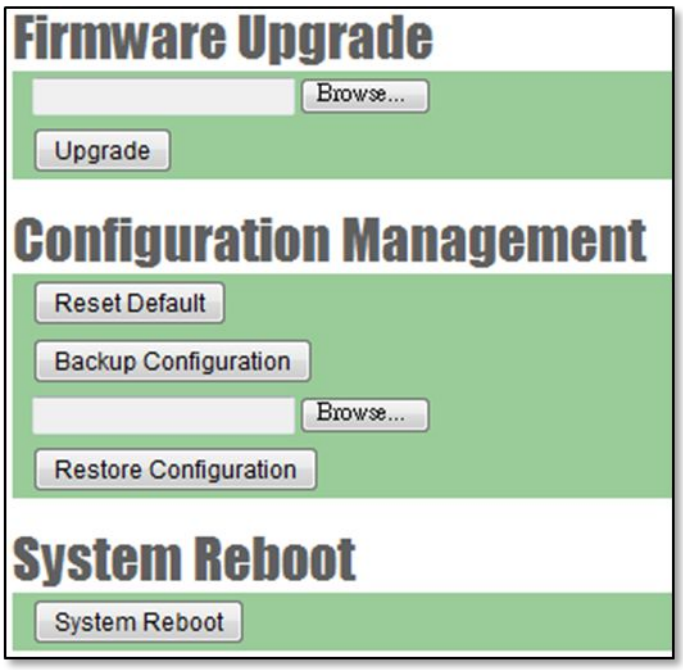
Profile ID There are 20 bandwidth control profiles can be configured for administration.

Mode Downstream and upstream data rates for subscriber or the client devices connecting to AP can be defined here. There are two bandwidth limit types in system. Both mode (UL+DL Limit Rate) consolidates download and upload rate of each single client connection. UL/DL mode (UL/DL Limit Rate) specifies download and upload rate of client connections. Once the bandwidth limit is enabled, the limitation applies to all clients that connect to the AP.

Administration

ST5801GB SERIES OUTDOOR AP/BRIDGE series provide system management in menu partition: Administration, Which includes configuration file management, password maintaining and SNMP setup.

Administration > Management

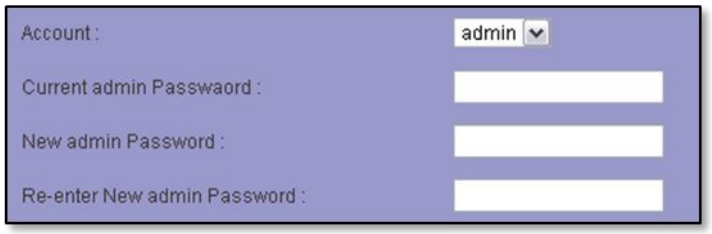


Firmware Upgrade Administrator can upload a new firmware file to device to keep system running by the latest bug fixed version of firmware.

Configuration Management Administrator would like to save the configuration of device to local PC by click “Backup Configuration”. Once hardware damage happened, administrator can restore a saved configuration file to a new hardware without any reconfiguration. “Reset Default” allows administrator to reload the system to factory default.

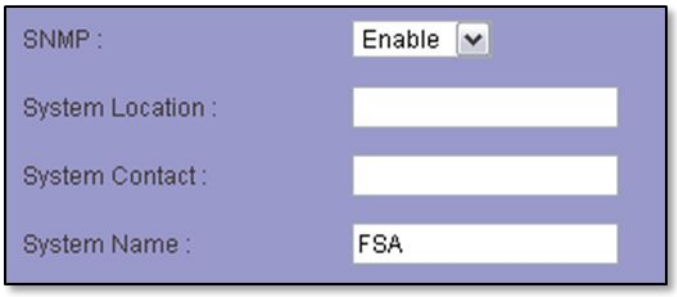
System Restart Click the “System Reboot” button will help to warm start the system.

Administration > Login Password



System allows administrator to change the “admin” and “user” login password in menu partition: “Login Password”.

Administration > SNMP Setup



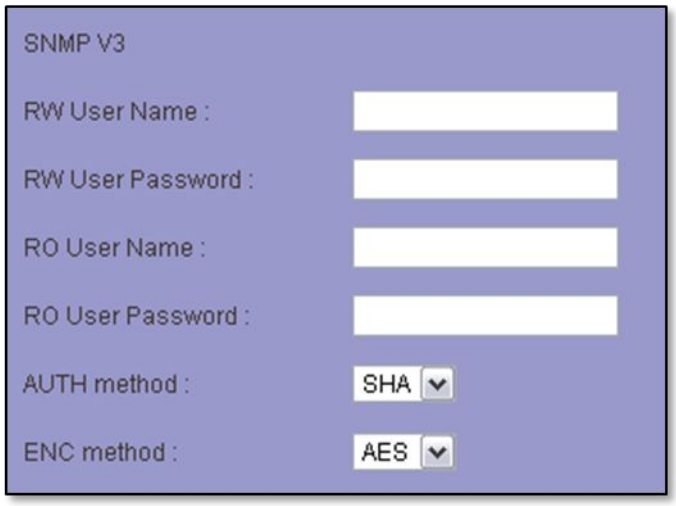
ST5801GB SERIES OUTDOOR AP/BRIDGE series support both SNMP V2 and V3. The configurable items show below:

System Location A description notes the device location.

System Contact A description notes the device maintaining information.

System Name A description notes the given name of device.

SNMP V3



RW User Name Read and write authority login ID.

RW User Password Read and write authority login password.

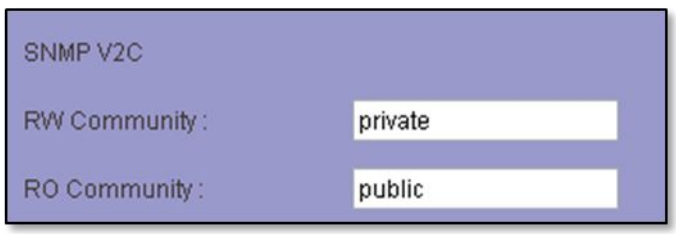
RO User Name Read only authority login ID.

RO User Password Read only authority login password.

AUTH method Choose the user authentication method.

ENC method Choose the SNMP data encryption method.

SNMP V2C



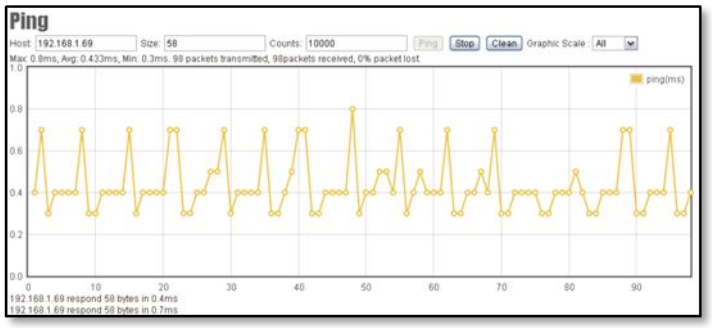
RW Community Read and write authority community stream.

RO Community Read only authority community stream.

Utility

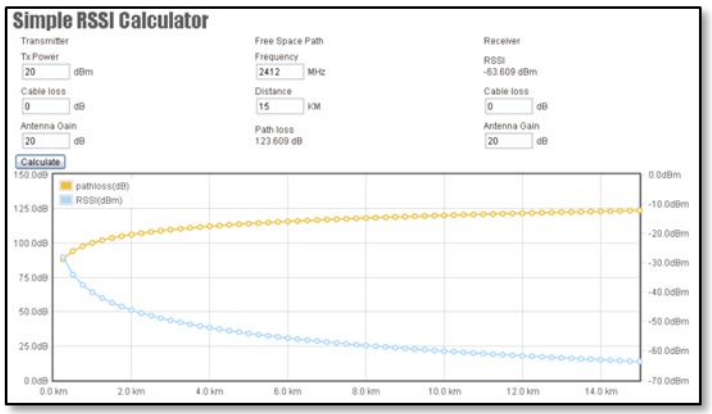
ST5801GB SERIES OUTDOOR AP/BRIDGE series provide various software utilities helping administrator to do the network status survey.

Utility > Ping



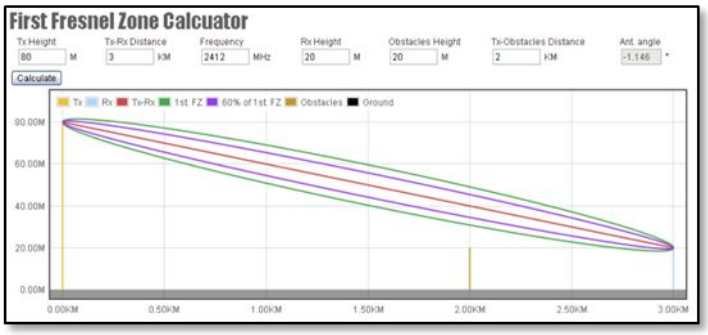
Graphical display helps administrator to get the responding time changes of target IP address. Insert the remote host IP address, packet size and number in field than press ***Ping***, system will show the result on page. The result presenting can be adjusted by different choosing of graphic scale.

Utility > RSSI Calculator



Simple RSSI Calculator helps to estimate a possible RSSI and path loss by known device Tx power (transmission power), cable loss, antenna gain and frequency both transmitting and receiving side. Graphic displaying shows changes of path loss and RSSI.

Utility > Fresnel Zone

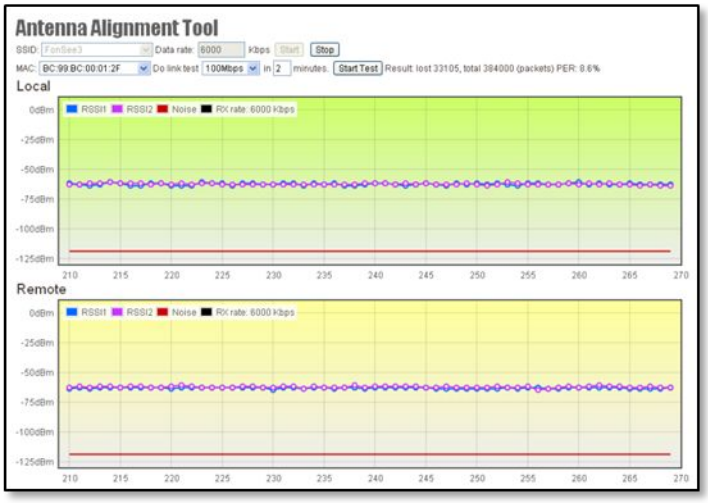


The First Fresnel Zone Calculator is a tool that helps you to estimate the possible obstruction from existing object between two devices before the wireless installation. An ***antenna angle*** calculation can also help you to aligning the vertical angle of the directional antenna.

Utility > Antenna Alignment Tool

In order to lift efficiency of antenna aligning, AMP-100R(H) series provide a software alignment tool helping the installers to align and check the antenna directions.

Antenna Alignment Tool will require triggering the function both access point and wireless station (AP Client) side. It means that both access point and wireless station (AP Client) side should be the ST5801GB SERIES OUTDOOR AP/BRIDGE series product, otherwise, the function doesn't get properly use.



Choose the SSID which you are going to do the

antenna aligning and click the ***Star*** button both access point and wireless station (AP Client) side to start the antenna alignment. You will able to see the RSSI changes in figure. Try to adjust the directional antenna's horizontal and vertical angle to get the best RSSI level.

Link Test

A ***Link Test*** is additional tool base on Antenna Alignment Tool active status. When you start the Antenna Alignment Tool, you may set a target throughput to active the ***Link Test*** to estimate the packet error rate.

Choose a target throughput and test duration than click Start Test button. System will generate a test data transmission to calculate the packet error rate.

An ***Rx rate*** shows the best data rate you can reach under the current RSSI level.

Link Test Tool can also help you to do the fine tuning of your antenna direction.

Utility > Site Survey

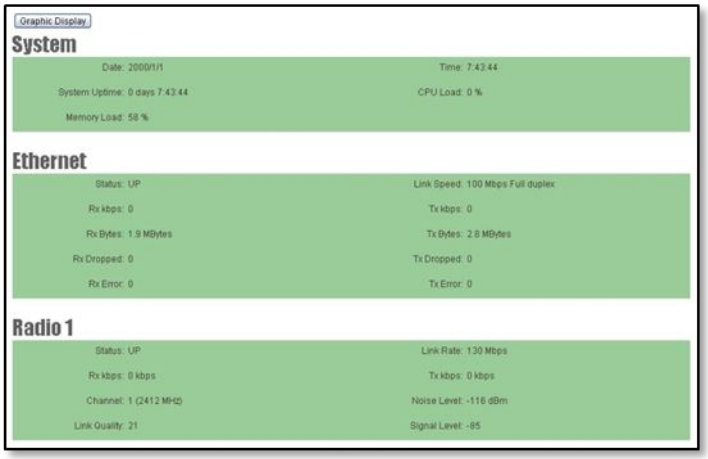
In wireless site survey, system provides a signal scan function to detect any available wireless signal around the AP. It will help AP installer to clarify the environment. Choose a radio interface which you are going to do the survey on device and click ***Scan*** button. After few seconds, system will show the APs around the device.

Status

Status > System Information

System Information summarizes all the configuration and hardware information of the device.

Status > System Status



Real-time link statuses of all interfaces are shown in the menu.

System Up Time Display how long ST5801GB SERIES OUTDOOR AP/BRIDGE has been operating since last boot-up.

Interface Status Indicate the interface is ENABLE or DISABLE.

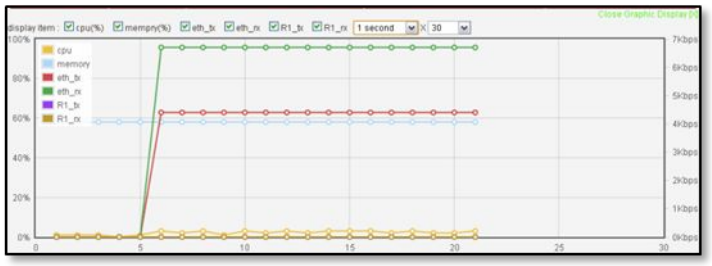
Link Rate Data Link Rate here indicates the maximum transmission rate available, and can be

used as an indication of link quality.

Link Quality A Calculation of RSSI, signal and noise level to indicate the quality of the communication link in percentage.

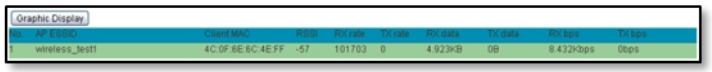
Channel The channel used by the wireless interface.

Signal Level A -70 ~ -50dBm signal level is recommended for a good connection. Too low a signal, the wireless link between AP and AC cannot be established. Too high a signal level, the power amplifier at the receiver might be forced to operate in saturation region and distorts the signal waveform.



In order to help user's reading of the changes, system also provide a graphic interface to trace the items' changes. Click the ***Graphic Display*** button on the top left of the page, graphic mode will show on your browser.

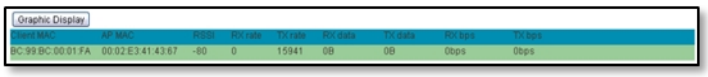
Status > Connecting Nodes Information



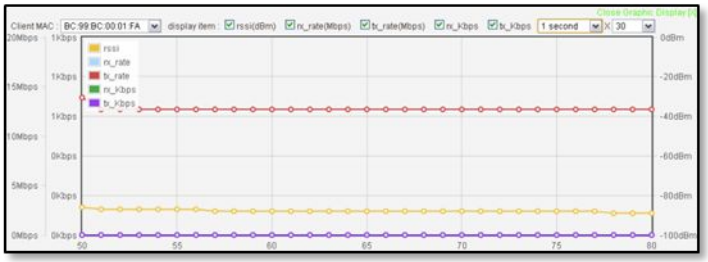
All the connecting clients' MAC address will be display in Connecting Nodes Information, including signal and data rate. The result shows information only when WLAN was configured as Access Point mode.

Graphic display is also available for observing the changes.

Status > Connecting AP Information



In the "Connecting AP Information" page, RSSI, Rx rate, Tx rate and etc. are provided for verification of wireless link status.



Graphic display is also available for observing the changes.

Appendix 1: Specifications

Hardware Specification

System Overall	
Main Processor	Atheros AR7161(680Mhz)
Wireless Chipset	Atheros AR9220 based miniPCI module, Up to three modules
Switch Controller	Atheros AR8035 / Atheros AR8021
Flash Memory	16MBytes
SDRAM	64MBytes(Up to 128MBytes)
Console	UART x 1(PCBA onboard)
RTC	Onboard RTC
PoE	48V 1A PoE
Ethernet	Gigabit Speed Support

Peripheral	
Wireless	Up to three 2x2 MIMO radios, mini-PCI version 1.0 type 3A Frequency ranges : a. USA : 2.400 ~ 2.483 GHz, 5.15 ~ 5.35 GHz, 5.5 ~ 5.7 GHz, 5.725 ~ 5.825 GHz b. Europe: 2.400 ~ 2.483 GHz, 5.15 ~ 5.35 GHz, 5.47 ~ 5.725 GHz c. Japan: 2.400 ~ 2.497 GHz, 5.15 ~ 5.35 GHz, 5.47 ~ 5.725 GHz d. China: 2.400 ~ 2.483 GHz, 5.725 ~5.85 GHz RF ourput power of DNMA-92 : a. IEEE802.11a 1. 21dBm@6M(all) 2. 17dBm@54M(5180MHz) 16dBm@54M(5825MHz) b. IEEE802.11b 1. 20dBm@1M(2412MHz) 19dBm@1M(2484MHz) 2. 21dBm@11M(all) c. IEEE802.11g 1. 23dBm@6M(all) 2. 19dBm@54M(all) d. IEEE802.11a/n HT20 1. 21dBm@MCS0/8(5180MHz) 19dBm@MCS0/8(5825MHz) 2. 16dBm@MCS7/15(5180MHz)

	14dBm@MCS7/15(5825 MHz) e. IEEE802.11a/n HT40 1. 19dBm@MCS0/8(5190MHz) 18dBm@MCS0/8(5795MHz) 2. 13dBm@MCS7/15(all) f. IEEE802.11g/n HT20 1. 21dBm@MCS0/8(all) 2. 17dBm@MCS7/15(all) g. IEEE802.11g/n HT40 1. 21dBm@MCS0/8(2422MHz) 20dBm@MCS0/8(2462MHz) 2. 16dBm@MCS7/15(all) Receive Sensitivity of DNMA-92 : a. IEEE802.11a 1. -82dBm@6M, 1Rx -95/-91dBm@6M, 2Rx 2. -65dBm@54M, 1Rx -79/-75dBm@54M, 2Rx b. IEEE802.11b 1. -82dBm@1M, 1Rx -95/-91dBm@1M, 2Rx 2. -76dBm@11M, 1Rx -91/-87dBm@11M, 2Rx c. IEEE802.11g 1. -82dBm@6M, 1Rx -95/-91dBm@6M, 2Rx 2. -65dBm@54M, 1Rx -80/-76dBm@54M, 2Rx d. IEEE802.11a/n HT20 1. -82dBm@MCS0, 1Rx -95/-91dBm@MCS0, 2Rx 2. -64dBm@MCS7, 1Rx
	-77/-73dBm@MCS7, 2Rx e. IEEE802.11a/n HT40 1. -79dBm@MCS0, 1Rx -91/-87dBm@MCS0, 2Rx 2. -61dBm@MCS7, 1Rx -74/-70dBm@MCS7, 2Rx f. IEEE802.11g/n HT20 1. -82dBm@MCS0, 1Rx -95/-91dBm@MCS0, 2Rx 2. -64dBm@MCS7, 1Rx -77/-73dBm@MCS7, 2Rx g. IEEE802.11g/n HT40 1. -79dBm@MCS0, 1Rx -90/-86dBm@MCS0, 2Rx 2. -61dBm@MCS7, 1Rx -74/-71dBm@MCS7, 2Rx RF output power of DNMA-H92 : a. IEEE802.11a 1. 24dBm@6M(all) 2. 21dBm@54M(all) b. IEEE802.11b 1. 24dBm@1M(all) 2. 24dBm@11M(all) c. IEEE802.11g 1. 25dBm@6M(all) 2. 22dBm@54M(all) d. IEEE802.11a/n HT20 1. 24dBm@MCS0/8(all) 2. 18dBm@MCS7/15(5180MHz) 17dBm@MCS7/15(5825MHz) e. IEEE802.11a/n HT40 1. 22dBm@MCS0/8(all) 2. 17dBm@MCS7/15(5190MHz)

	16dBm@MCS7/15(5795 MHz) f. IEEE802.11g/n HT20 1. 25dBm@MCS0/8(all) 2. 21dBm@MCS7/15(all) g. IEEE802.11g/n HT40 1. 24dBm@MCS0/8(all) 2. 20dBm@MCS7/15(all) Receive Sensitivity of DNMA-H92 : a. IEEE802.11a 1. -82dBm@6M, 1Rx -95/-91dBm@6M, 2Rx 2. -65dBm@54M, 1Rx -79/-75dBm@54M, 2Rx b. IEEE802.11b 1. -82dBm@1M, 1Rx -92/-88dBm@1M, 2Rx 2. -76dBm@11M, 1Rx -92/-88dBm@11M, 2Rx c. IEEE802.11g 1. -82dBm@6M, 1Rx -95/-91dBm@6M, 2Rx 2. -65dBm@54M, 1Rx -80/-76dBm@54M, 2Rx d. IEEE802.11a/n HT20 1. -82dBm@MCS0, 1Rx -95/-91dBm@MCS0, 2Rx 2. -64dBm@MCS7, 1Rx -77/-73dBm@MCS7, 2Rx e. IEEE802.11a/n HT40 1. -79dBm@MCS0, 1Rx -91/-87dBm@MCS0, 2Rx 2. -61dBm@MCS7, 1Rx -73/-69dBm@MCS7, 2Rx f. IEEE802.11g/n HT20 1. -82dBm@MCS0, 1Rx

	-95/-91dBm@MCS0, 2Rx 2. -64dBm@MCS7, 1Rx -77/-73dBm@MCS7, 2Rx g. IEEE802.11g/n HT40 1. -79dBm@MCS0, 1Rx -92/-88dBm@MCS0, 2Rx 2. -61dBm@MCS7, 1Rx -74/-70dBm@MCS7, 2Rx
Ethernet	10/100/1000 Base-TX MDI/MDIX RJ-45 x 1 Compliant with : a. IEEE802.3 / 802.3u / 802.3at b. Hardware based 10/100/1000, full/half, flow control auto negotiation
Connector	2 x N-type(1 radio) 4 x N-type(2 radios) 6 x N-type(3 radios)
Power Requirement	48V 1A PoE Support Gigabit Ethernet Link
Watch Dog	Hardware Watch Dog

Physical	
Dimensions	220 x 220 x 77 mm
Weight	2.0kg(3.7kg mount kit included)
Water and Dust Proof	Outdoor IP67 rated

Environmental	
Temperature Range	-20 ~ 70°C
Humidity	0~95%

Software Specification

System Operation	
Bridge Mode	Layer 2 Switching Learning Technology
	Store-and-Forward
	Spanning Tree Protocol - IEEE 802.1d STP / IEEE 802.1w RSTP
	Static IP
	DHCP server / client
	IEEE 802.1q Tag VLAN
	IEEE 802.1p VLAN Priority Based QoS

Network Interface	
Wireless	IEEE 802.11 a/b/g/n 2.4GHz / 5GHz Dual Band Radio
	2 x 2 MIMO Technology
	Single Radio / Dual Radios / Triple Radios
	AP mode / Client mode
	WDS Support enable / disable
	IEEE 802.11h DFS
	WMM QoS
	Channel / Tx Power / Data Rate / Max Distance Adjustable
	Multi-SSIDs / VLAN tags mapping(Up to 16 x ESSIDs for each radio)
	Wireless Site Survey
	Node Information
	Concurrent Connected Node Limitation
	Client User Isolation
Wire	48V 1A PoE Support Gigabit Ethernet Speed
	Ethernet Link Speed Configurable
	10/100/1000 Base-TX MDI/MDIX RJ-45

Performance		
Wireless To Wire	TCP	Up to 180Mbps for one radio to Ethernet
		Up to 320Mbps for multiple radios to Ethernet
	UDP	Up to 240Mbps for one radio to Ethernet
		Up to 350Mbps for multiple radios to Ethernet
	PPS	>= 20,000@short packet for one radio to Ethernet
		>= 28,000@short packet for multiple radios to Ethernet
	Latency	< 5ms
Multiple Hops	2 hops	Up to 160Mbps
	3 hops	Up to 150Mbps
	>= 4hops	Up to 140Mbps
	PPS	>= 20,000@short packet at multiple hops
	Latency	< 10ms

Security
Hide SSID(turn off ESSID broadcasting)
MAC Address ACL
WEP 64/128/152 bits
IEEE 802.1x EAP-MD5 / EAP-TLS / EAP-TTLS
WPA / WPA2 PSK / EAP with TKIP / CCMP AES based Encryption

Management
HTTP(s) WEB GUI
Telnet
SSH
Console(optional interface)
CLI commands
SNMP v2c/v3, standard / private MIBs
Syslog
Management VLAN Tag
NTP Client
Firmware upgrade / downgrade
Dual Images
Dual Configuration files / Factory Default
Multiple Level Management

Advanced Technology	
Multiple Hopping	Up to 10 hops with more than 120Mbps throughput
	Configurable Max. Hop Counts(default 20 hops)
Advanced Features	Wireless Bandwidth Limitation